occurred between day 10 ± 1 and 3 month. 4 patients died after hospital discharge (no death directly related to thromboembolic disease).

Thus no higher risk of PE can be seen in patients with free floating prox-DVT and anticoagulant therapy should be efficient to prevent recurrent PE in such patients.

980-89 Lack of Evidence for Atrial Stunning After DC Shock in Patients in Normal Sinus Rhythm Undergoing ICD Insertion: A Study Using TEE

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Transient left atrial (LA) dysfunction ("stunning") and the appearance of spontaneous echo contrast ("smoke") have been reported in patients undergoing DC cardioversion of atrial fibrillation. It has been suggested that cardioversion-induced LA dysfunction may promote new thrombus formation leading to thromboembolic complications in AF patients even in the absence of demonstrable LA thrombus prior to cardioversion. In order to confirm previous observations of LA stunning end to investigate the determinants of this response, we investigated LA function in a series of patients undergoing implantable defibrillator insertion and testing. Eight patients (67 ± 6 yrs, 5 M/3 F) with ischemic heart disease (n = 6) or cardiomyopathy (n = 2) and VT/VF were studied. All patients were in NSR, had significant impairment of systolic LV function, and demonstrated inducible VT or VF in the EP lab. Intraoperative transesophegeal echocardiography with a biplane or multiplane probe was used to image the LA, mitral valve and LA appendage (LAA). Blood flow velocities were measured at the tips of the MV leaflets and LAA orifice by pulsed-wave Doppler before and 30 to 120 seconds after DC shocks of 15–20 joules with transvenous intracardiac electrodes (in SVC and RV apex, n = 7) or epicardial patches (n = 1) while in sinus rhythm. Measurements from three different cardiac cycles were averaged for each patient. Baseline LAA orifice flow velocity was 44 ± 16 cm/s and remained unchanged after DC shock, 46 ± 20 cm/s (p = ns). Similarly, MV peak A-wave velocity was 70 ± 34 cm/s at baseline and was not significantly different after DC shock, 69 ± 42 cm/s (p = ns). No evidence of LA "smoke" was seen in any patient before or after the shock. *Conclusion:* As opposed to previous reports after cardioversion of atrial fibrillation, DC shocks alone do not produce LA dysfunction in patients in NSR even in the presence of left venticular dysfunction. LA stunning after DC shocks may require prior atrial fibrillation or specific atrial substrate.

980-90 Superior Vena Cava Versus Right Atrium Central Venous Catheter Placement Avoids Thrombosis: The Role of Transesophageal Echocardiography in Diagnosis and Evaluation — A Prospective Study

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Intravenous central line (Hickman type) catheters (CL) are routinely used in the management of chronically ill patients. These CLs are placed in the superior vena cava (SVC) or right atrium (RA) and are often associated with complications, mainly thrombosis or infection. The introduction of transesophageal echo (TEE) has significantly improved the imaging of intracardiac structures, especially left atrial thrombi and right atrial masses. We explored the use and importance of TEE (and compared to transthoracic echo ((TTE)) for early evaluation of CL placement and detection of related masses. *Methods:* We prospectively studied fifty-five (55) bone marrow transplantation (BMT) patients by TTE and TEE at an asymptomatic stage within a week post-Hickman catheter (CL) implantation and on a follow-up study after 6–8 weeks. We looked for the exact CL tip placement and searched for possible presence of any related abnormalities. *Results:* Of the fifty-five patients in the first study, the CL tips could be demonstrated in 48 (87%) of them by TEE compared to only 4 (8%) by TTE. 13 were placed in the right atrium (RA), 8 at he superior vena cave-right atrium junction (SVC-RA), and 27 in the s superior vena-cava (SVC). *An abnormal mass was found in six patients (12.5%).* All of these presumed thrombi were seen in patients in whom the CL tip was placed in the RA (Table)

No. of Patients	CL location	Thrombi
27	SVC	0
8	SVC-RA	0
13	RA	6 (p < 0.001)

Conclusions: TEE studies performed in an asymptomatic setting of BMT patients within a week post-routine CL implantation demonstrated *unexpected, asymptomatic catheter-tip related masses, consistent with thrombosis, in the RA of 12.5% of patients.* These findings suggest that: (1) CL should be placed in the SVC or SVC-RA junction, in contrast to the RA. (2) TEE is a useful tool for guiding CL's placement in severely immunocompromised, chronically ill patients, to avoid formation of thrombi.

980-91 Predictors of Thrombus Formation After Anterior Myocardial Infarction: Evidence of Protective Effect of Mitral Regurgitation

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It has been shown that mitral regurgitation (MR) prevents thrombus (T) formation in pts with dilated cardiomyopathy. Also, the relationship between low velocity ventricular flow and T formation after MI was recently demonstrated. However, no clinical study has shown that MR has independent effect on T formation in acute myocardial infarction (MI). In order to determine predictors of T after anterior MI, we have analyzed *clinical* (age, sex, Killip class, thrombolysis, peak CK values), *echocardiographic* (left ventricular end-diastolic volume index-EDVi, end-systolic volume index-ESVi, ejection fraction-EF, wall motion score index-WMSi, apical wall motion abnormalities, presence of MR) and *angiographic* (extent of coronary artery disease-CAD, patency of infarct related artery-IRA) variables in 54 consecutive pts with anterior MI. Two-dimensional and Doppler echocardiographic examinations were performed in the following sequence: day 1, day 2, day 3, day 7, after 3 and 6 weeks, 3 and 6 months and 1 year following MI. Pts with and without T were similar regarding age, sex and antithrombotic therapy. According to Cox's regression model $p < 0.1$ was considered significant.

Results: T was detected in 31/54 pts (30/31 in the first week after MI). Univariate analysis showed that T was associated with Killip class >1 (beta = 0.6, p = 0.01), larger initial EDVi (beta = 1.7, p = 0.04) and ESVi (beta = 2.3, p = 0.002) and higher WMSi (beta = 0.7, p = 0.02). According to Cox's proportional regression model, *significant independent predictors* of T after MI were: high peak CK values (beta = 4.1, p = 0.06), initial EF ≤40% (beta = −0.8, p = 0.07), absence of MR (beta = −0.6, p = 0.06), and multivessel CAD (beta = 0.5, p = 0.06).

Conclusion: Our data demonstrate that T after anterior MI is associated with large infarcts, poor left ventricular function and multivessel CAD. Since the absence of MR is also associated with T, it appears that MR may have protective effect on T formation after anterior MI.

981 Exercise Physiology in Heart Failure

Tuesday, March 21, 1995, 3:00 p.m.–5:00 p.m.
Ernest N. Morial Convention Center, Hall E
Presentation Hour: 3:00 p.m.–4:00 p.m.

981-46 Impact of a Comprehensive Management Program on the Hospitalization Rate for Patients with Advanced Heart Failure

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Patients with advanced heart failure have a course that is often characterized by frequent hospitalizations and progressive deterioration. These patients are commonly referred to specialized centers for consideration of heart transplantation (Tx). To assess the impact of the changes in therapy made in conjunction with heart transplantation evaluation on patient outcomes, we assessed the hospitalization rate and patient's functional status in the 6 months prior to referral compared to the 6 months after referral. Since 1/91, 214 patients were evaluated, accepted for Tx, and discharged having undergone adjustments in medical therapy and a comprehensive patient education program. At time of referral patients had mean LVEF 0.21, NYHA class 3.3, VO_2 max 11.0 ml/kg, and had undergone a total of 429 hospitalizations in the previous 6 months. During evaluation patients had their ACE inhibitor dose increased by a mean 91.5 mg/day of captopril or the equivalent, were diuresed a mean 4.2 liters, were placed on a flexible regimen of loop diuretics, and were counseled on dietary management and home based progressive aerobic exercise. After 6 months of follow-up there were only 63 hospitalizations required (mean hospitalization rate per patient over the 6 months pre-evaluation 2.00 ± 1.45 vs post-evaluation 0.29 ± 0.53 p < 0.00001). Patient's NYHA class improved to 2.4 (p < 0.0001) and VO_2 max increased to 15.2 (p < 0.001). Excluding the 12 elective status Tx, 14 urgent status Tx, and 9 deaths within 6 months yielded similar results (344 pre vs 34 post-evaluation hospitalizations). 64 patients (30%) improved their functional status to the point that transplantation was deferred in favor of sustained medical therapy.

Referral to a heart failure specialty program is associated with a dramatic